



Navajo Technical University

P.O. Box 849, Crownpoint, NM
87313-0849

Tel: (505) 786-4100

<http://navajotech.edu>

FAX: (505) 786-5644

Course Title: CHARACTERISTICS OF MATERIALS
Course #: ENGR 143 -1

Credit Hours: 3

Semester: 1

Cap:15

Faculty: Dr.Raggs

E-mail: raggs@navajotech.edu

Office: Tech 325

Office Phone: 505-409-0663

Office Hours (face-to-face or online): Monday 1-2 pm ONLINE

Preferred Communication (email and/or text; will respond within 24 hours):

Modality (face-to-face, hybrid, or online): ONLINE

Class Location and Meeting Times (if face-to-face):

Meeting Hours and Online Hours (if hybrid): (Friday 8.30 am to 11 am)

Required Materials:

Textbooks:

Study material provided by Tooling –U is exhaustive. But interested students may use the following books for further reference.

(1) Kenneth G.Budinski and Michael K. Budinski, “Engineering Materials”, Prentice Hall of India Private Limited, 4th Reprint 2002.

(2) Williams D Callister, “Material Science and Engineering” Wiley India Pvt Ltd, Revised edition 2007.

Tools: Every Student is required to have a laptop with good internet connection and Access to Tooling-U software through book_store@NTU

Lab Fee (if applicable): As applicable

Mission Statement

Navajo Technical University’s mission is to provide University readiness programs, certificates, associate, baccalaureate, and graduate degrees. Students, faculty, and staff will provide value to the Diné community through research, community engagement, service learning, and activities designed to foster cultural and environmental preservation and sustainable economic development. The University is committed to a high quality, student-oriented, hands-on-learning environment based on the Diné cultural principles: *Nitsáhákees, Nahátá, Íina, Sihasin.*

Course Description

This course introduces the basic features of engineering materials like metals, plastics, ceramics and composites. Topics include Nature of materials and their physical, mechanical, thermal and electrical properties,

manufacturing methods of Materials, their heat treatments and processing, application of those materials in various engineering fields.

TOTAL: 45 Hrs

Course Outcomes	Course Measurements
Ability to understand the phase diagram and use the of iron-iron carbide phase diagram for microstructure formation.	Complete reading assignments, pretests (quizzes), final exams provided t the end of each module in Tooling –U, which will be considered as assignments, exams and projects if any.
Select and apply various heat treatment process and its microstructure formation.	
Apply the different types of ferrous and non-ferrous alloys and their uses in engineering field.	
Apply the different polymer, ceramics and composites and their uses in engineering field.	
Apply the various processing and testing procedures for different materials in engineering field.	

Course Activities

Week	Date	Chapters	Assignments & Quizzes	Remarks
		Last day to add/drop		
1	01/21/2022	Introduction to Physical Properties	Due before next class	
2	01/28/2022	Introduction to Mechanical Properties	“	
3	02/04/2022	Introduction to Metals	“	
		Graduation Petition is due		
4	02/11/2022	Introduction to plastics	“	
5	02/18/2022	Introduction to ceramics	“	
6	02/25/2022	Introduction to Composites	“	
7	03/04/2022	Metal Manufacturing	“	
8	03/11/2022	Classification of Steels	“	
	03/11/2022		Midterm	
		Midterm grades are due		
9	03/18/2022	Essentials of heat treatment	“	
		Last day to withdraw with a “W”		
10	03/25/2022	Ferrous & Non Ferrous Metals	“	
11	04/01/2022	Polymer Composite Processes	“	
12	04/08/2022	Thermoplastics	“	
13	04/15/2022	Thermosets	“	
14	04/22/2022	Exotic Alloys	Due on or before 04/22	

15	04/29/2020	End Semester Exam		
16		Grades are due to the Registrar		

Grading Plan

Assignments	40%	A = 100 - 90%
Mid-term	25%	
End Sem	25%	B = 89 - 80%
Quizzes	5%	C = 79 - 70%
Class Participation	3%	D = 69 - 60%
Portfolio:	2%	F < 60%

Grading Policy

Each student must do his or her own assignments and case studies. Discussion among students on assignments and cases is encouraged for clarification of assignments, technical details of using software, and structuring major steps of solutions - especially on the course's Web site. Students must do their own work on the assignments and exam. Cheating and Plagiarism are strictly forbidden. Cheating includes but is not limited to: plagiarism, submission of work that is not the student's own, submission or use of falsified data, unauthorized access to exam or assignment, use of unauthorized material during an exam, supplying or communicating unauthorized information for an assignment or exam.

Participation

Students are expected to attend and participate in all class activities- as listed above, as it **is 3% of the grade**. Points will be given to students who actively participate in class activities including field trips, laboratories, and ask questions of guest speakers and other presenters. Those who attend all the classes without absent, only will be given 3% weightage.

Cell phone and headphone use

Please turn cell phones off or place them on silence or vibrate mode **before** coming to class. Also, answer cell phones **outside of class** (not in the classroom). Exercising cell phone use courtesy is appreciated by both the instructor and classmates. Headphones are to be removed before coming to class.

Attendance Policy

Students are expected to regularly attend all classes for which they are registered. A percentage of the student's grade will be based on class attendance and participation. Absence from class, regardless of the reason, does not relieve the student of his/her responsibility to complete all course work by the required deadlines. Furthermore, it is the student's responsibility to obtain notes, handouts, and any other information covered when absent from class and to arrange to make up any in-class assignments or tests if permitted by the instructor. Late, incomplete or missing assignments will necessarily affect the student's grades. Instructors will report excessive and/or unexplained absences to the Counseling Department for investigation and potential intervention. **Instructors may drop students from the class after three (3) absences unless prior arrangements are made with the instructor to make up work and the instructor deems any excuse acceptable.**

Study Time Outside of Class for Face-to-Face Courses

For every credit hour spent in a class, a student is expected to spend two hours (2) outside of class studying the course materials.

Study Time for Hybrid or Blended Courses

For a hybrid or blended course of one (1) credit hour, a student is expected to spend three (3) hours per week studying the course materials.

Study Time for Online Courses

For an online course of one (1) credit hour, a student is expected to spend four hours (4) per week studying the course materials.

Academic Integrity

Integrity (honesty) is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own. Students who engage in academic dishonesty diminish their education and bring discredit to the University community. Avoid situations likely to compromise academic integrity such as: cheating, facilitating academic dishonesty, and plagiarism; modifying academic work to obtain additional credit in the same class unless approved in advance by the instructor, failure to observe rules of academic integrity established by the instructor. **The use of another person's ideas or work claimed as your own without acknowledging the original source is known as plagiarism and is prohibited.**

Diné Philosophy of Education

The Diné Philosophy of Education (DPE) is incorporated into every class for students to become aware of and to understand the significance of the four Diné philosophical elements, including its affiliation with the four directions, four sacred mountains, the four set of thought processes and so forth: Nitsáhákees, Nahát'á, Íina and Siih Hasin which are essential and relevant to self-identity, respect and wisdom to achieve career goals successfully.

Students with Disabilities

The Navajo Technical University and **Dr. Ragavanantham Shanmugam, Assistant Professor, School of Engineering, Math and Technology** are committed to serving all enrolled students in a non-discriminatory and accommodating manner. Any student who feels he/she may need an accommodation based on the impact of disability or needs special accommodations should inform NTU in accordance with the procedures of the subsection entitled "Students with Disabilities" under Section 7: Student Support Programs, NTU Student Handbook.

Final Exam Date: Will be announced later (in the regular class hour)